

What is claimed is:

1. A toner for electrostatic development comprising:

toner particles, each toner particle comprising:
a binder resin comprising a modified polyester resin
and a crystalline polyester resin; and
a colorant,

wherein the toner particles are obtained by the
process comprising the steps of:

subjecting the modified polyester resin to at
least one of dissolving and dispersing in an organic
solvent to yield a solution or dispersion, the modified
polyester resin being reactive with a compound having an
active hydrogen group;

mixing the solution or dispersion with an
aqueous medium comprising resin particles; and

subjecting the modified polyester resin to at
least one of crosslinking and elongation in the aqueous
medium.

2. A toner for electrostatic development according
to Claim 1, wherein the binder resin comprises:

the modified polyester resin (i),
an unmodified polyester resin (ii), and

the crystalline polyester resin (iii),
wherein the weight ratio of the modified polyester resin (i) to the total of the unmodified polyester resin (ii) and the crystalline polyester resin (iii) is from 5:95 to 25:75, and

wherein the weight ratio of the unmodified polyester resin (ii) to the crystalline polyester resin (iii) is from 99:1 to 50:50.

3. A toner for electrostatic development according to Claim 1, wherein the toner has a glass transition point T_g of 40°C to 70°C.

4. A toner for electrostatic development according to Claim 1, wherein the toner has a flow beginning temperature T_{fb} of 70°C to 150°C.

5. A toner for electrostatic development according to Claim 1, wherein the toner particles have a volume-average particle diameter of 4 μm to 8 μm.

6. A toner for electrostatic development according to Claim 1, wherein the toner particles have a volume-average particle diameter D_v and a number-average particle diameter D_n, and wherein the

ratio D_v/D_n of D_v to D_n is from 1.00 to 1.25.

7. A toner for electrostatic development according to Claim 1, wherein the toner particles have an average sphericity of 0.95 to 0.99.

8. A toner for electrostatic development according to Claim 1, wherein, in a molecular weight distribution of tetrahydrofuran (THF)-soluble components of the polyester resins in the toner, the peak molecular weight is 1,000 to 30,000, the content of a component having a molecular weight of 30,000 or more is 1% by volume to 80% by volume, and the number-average molecular weight is from 2,000 to 15,000

9. A toner for electrostatic development according to Claim 8, wherein, in a molecular weight distribution of tetrahydrofuran (THF) soluble components of the polyester resins in the toner, the content of a component having a molecular weight of 1,000 or less is from 0.1% by volume to 5.0% by volume.

10. A toner for electrostatic development according to Claim 8, wherein the content of tetrahydrofuran-insoluble components in the polyester

resins in the toner is from 1% by volume to 15% by volume.

11. A toner for electrostatic development according to Claim 1, wherein the resin particles have a volume-average particle diameter of 5 nm to 500 nm.

12. A toner for electrostatic development according to Claim 1, wherein the toner particle further comprises a releasing agent, wherein the releasing agent is a wax immiscible with the binder resin.

13. A toner for electrostatic development according to Claim 12, wherein the wax is a polyalkanoic acid ester.

14. A toner for electrostatic development according to Claim 1, the toner particle further comprises a lubricant, wherein the lubricant is capable of controlling the miscibility of the crystalline polyester resin with the other components in the binder resin.

15. A toner for electrostatic development according to Claim 14, wherein the lubricant is at least one selected from the group consisting of montanic acid wax, montanic ester wax and partially saponified ester wax.

16. A toner for electrostatic development according to Claim 1, the toner particle further comprises a charge control agent.

17. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin is dispersed in the toner particle wherein the dispersed particle of the crystalline polyester resin has a major axis of 0.2 μm to 3.0 μm .

18. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin has an endothermic peak temperature in differential scanning calorimetry (DSC) of 50°C to 150°C.

19. A toner for electrostatic development according to Claim 1, wherein, in a molecular weight distribution of o-dichlorobenzene-soluble component in the crystalline polyester resin determined by gel permeation chromatography (GPC), the o-dichlorobenzene-soluble component has a weight-average molecular weight M_w of 1,000 to 6,500, a number-average molecular weight M_n of 500 to 2,000, and a ratio M_w/M_n of M_w to M_n of 2 to 5.

20. A toner for electrostatic development according to Claim 19, wherein the weight-average molecular weight Mw is 5,500 to 6,500, the number-average molecular weight Mn is 1,300 to 1,500, and the ratio Mw/Mn is from 2 to 5.

21. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin is represented by following Formula (1):



wherein R₁ and R₂ are each a hydrocarbon group having 1 to 20 carbon atoms.

22. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin comprises an alcohol component and an acid component, wherein the alcohol component comprises a diol compound having 2 to 6 carbon atoms and the acid component comprises at least one selected from the group consisting of maleic acid, fumaric acid, succinic acid and derivatives thereof.

23. A toner for electrostatic development according to Claim 22, wherein the alcohol component comprises at least one selected from the group consisting of

1,4-butanediol, 1,6-hexanediol and derivatives thereof.

24. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin has a glass transition point T_g of 30°C to 130°C and a $F_{1/2}$ temperature of 60°C to 130°C.

25. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin has an acid value of 20 mgKOH/g to 45 mgKOH/g.

26. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin has a hydroxyl value of 5 mgKOH/g to 50 mgKOH/g.

27. A toner for electrostatic development according to Claim 1, wherein the crystalline polyester resin shows diffraction peaks at least at points of 2θ of 19° to 20°, 21° to 22°, 23° to 25°, and 29° to 31° in an X-ray diffraction pattern determined with an X-ray powder diffractometer.

28. A toner for electrostatic development according to Claim 1, wherein the modified polyester resin reactive with a compound having an active hydrogen group, is a modified polyester resin capable of having a urea bond.

29. A toner for electrostatic development according to Claim 1, wherein the process further comprises a step of removing the organic solvent with an application of at least one of reduced pressure and heat.

30. A toner for electrostatic development according to Claim 1, wherein the process further comprises the steps of subjecting the crystalline polyester resin to at least one of dissolving and dispersing in an organic solvent as particles having a volume-average particle diameter of 0.2 μm to 3 μm to yield a dispersion; and mixing the dispersion with the aqueous medium together with the modified polyester resin reactive with a compound having an active hydrogen group.

31. A toner for electrostatic development according to Claim 1, wherein the process further comprises the steps of dissolving or dispersing the colorant in an organic solvent to yield a solution or dispersion, and mixing the solution or dispersion with the aqueous medium together with the modified polyester resin reactive with a compound having an active hydrogen group.

32. A toner for electrostatic development according

to Claim 31, wherein the process further comprises the steps of kneading the colorant and at least part of the binder resin with water to yield a composition; dissolving or dispersing the composition in an organic solvent to yield a solution or dispersion; and mixing the solution or dispersion with the aqueous medium.

33. A toner for electrostatic development according to Claim 1, wherein the colorant is dispersed in the toner particles as particles having a number-average particle diameter of 0.5 μm or less, and wherein the content of colorant particles having a number-average particle diameter of 0.7 μm or more is 5% by number or less.

34. A toner for electrostatic development according to Claim 2, wherein the unmodified polyester resin (ii) has a glass transition point T_g of 40°C to 80°C.

35. A toner for electrostatic development according to Claim 2, wherein the unmodified polyester resin (ii) has a weight-average molecular weight of 2,000 to 90,000.

36. A toner for electrostatic development according to Claim 12, wherein the wax has a melting point of 40°C to 160°C.

37. A toner for electrostatic development according to Claim 1, wherein the toner particle comprises an external additive,

wherein the external additive is at least one of inorganic particles and resin particles.

38. A process for producing a toner for electrostatic development, comprising the steps of:

mixing an aqueous medium comprising resin particles with:

(1) an organic solvent comprising a modified polyester resin being subjected to at least one of dissolving and dispersing therein wherein the modified polyester is reactive with a compound having an active hydrogen group,

(2) an organic solvent comprising a crystalline polyester resin dispersed therein as particles having a volume-average particle diameter of 0.2 μm to 3 μm , and

(3) an organic solvent comprising a colorant dissolved or dispersed therein;

subjecting the modified polyester resin to at least one of crosslinking and elongation in the aqueous medium; and

removing the organic solvents,

wherein the toner comprises a binder resin and the colorant, and
wherein the binder resin comprises the modified polyester resin and a crystalline polyester resin.

39. A one-component developer comprising:
a toner,

wherein the toner comprises toner particles, each toner particle comprising:

a binder resin comprising a modified polyester resin and a crystalline polyester resin; and

a colorant,

wherein the toner particles are obtained by the process comprising the steps of:

subjecting the modified polyester resin to at least one of dissolving and dispersing in an organic solvent to yield a solution or dispersion, the modified polyester resin being reactive with a compound having an active hydrogen group;

mixing the solution or dispersion with an aqueous medium comprising resin particles, and

subjecting the modified polyester resin to at least one of crosslinking and elongation in the aqueous medium.

40. A two-component developer comprising:
a carrier; and
a toner, the toner comprising toner particles each comprising:
a binder resin comprising a modified polyester resin and a crystalline polyester resin; and
a colorant,
wherein the toner particles are obtained by the process comprising the steps of:
subjecting the modified polyester resin to at least one of dissolving and dispersing in an organic solvent to yield a solution or dispersion, the modified polyester resin being reactive with a compound having an active hydrogen group;
mixing the solution or dispersion with an aqueous medium comprising resin particles, and
subjecting the modified polyester resin to at least one of crosslinking and elongation in the aqueous medium.
41. A container for a developer, comprising:
a developer housed in the container,
wherein the developer comprising a toner, the toner comprising toner particles each comprising:
a binder resin comprising a modified polyester resin

and a crystalline polyester resin; and

a colorant,

wherein the toner particles are toner obtained by the process comprising the steps of:

subjecting the modified polyester resin to at least one of dissolving and dispersing in an organic solvent to yield a solution or dispersion, the modified polyester resin being reactive with a compound having an active hydrogen group;

mixing the solution or dispersion with an aqueous medium comprising resin particles, and

subjecting the modified polyester resin to at least one of crosslinking and elongation in the aqueous medium.

42. An image forming process comprising the steps of:

charging a photoconductor;

irradiating the photoconductor with imagewise light so as to form a latent electrostatic image;

developing the latent electrostatic image with a toner so as to form a toner image;

transferring the toner image from the photoconductor to a recording material; and

heating and pressing the transferred image with a

fixing member so as to fix the image on the recording material,

wherein the fixing member is at least one of a roller and a belt, and

wherein the toner is a toner for electrostatic development, the toner comprising toner particles each comprising:

a binder resin comprising a modified polyester resin and a crystalline polyester resin; and

a colorant,

wherein the toner particles are obtained by the process comprising the steps of:

subjecting the modified polyester resin to at least one of dissolving and dispersing in an organic solvent to yield a solution or dispersion, the modified polyester resin being reactive with a compound having an active hydrogen group;

mixing the solution or dispersion with an aqueous medium comprising resin particles, and

subjecting the modified polyester resin to crosslinking and/or elongation in the aqueous medium.